

Notice of Allowability

Application No.

09/842,483

Examiner

Mark Ruthkosky

Applicant(s)

LI ET AL.

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 11/24/2003.
2. ☒ The allowed claim(s) is/are 1,3,5,7,9,11,13,15 and 17-22.
3. ☒ The drawings filed on 25 April 2001 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.
5. ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
 - (a) ☐ The translation of the foreign language provisional application has been received.
6. ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE**

7. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
8. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No. _____.
 - (b) ☐ including changes required by the proposed drawing correction filed _____, which has been approved by the Examiner.
 - (c) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No. _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the margin according to 37 CFR 1.121(d).

9. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|---|
| 1 <input type="checkbox"/> Notice of References Cited (PTO-892) | 5 <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2 <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6 <input type="checkbox"/> Interview Summary (PTO-413), Paper No. _____ |
| 3 <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No. _____ | 7 <input type="checkbox"/> Examiner's Amendment/Comment |
| 4 <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material | 8 <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9 <input type="checkbox"/> Other |

Art Unit: 1745

DETAILED ACTION

Claim Objections

The objection to claims 1, 3, 5, 7, 9, 11, 13 and 15, because of the \leq sign missing between the x and the 2 in the claims, has been overcome by the applicant's amendment.

Claim Rejections - 35 USC § 103

The rejection of claims 1, 5, 9, 11, 13 and 15 under 35 U.S.C. 103(a) as being unpatentable over Goodenough et al. (US 5,910,382) in view of Iwata et al. (US 5,807,646) has been overcome by the applicant's amendment.

Allowable Subject Matter

Claims 1, 3, 5, 7, 9, 11, 13 and 15 and 17-22 are allowed.

The following is an examiner's statement of reasons for allowance:

The instant claims are to a lithium transition metal phosphate positive active material having the formulae $\text{Li}_x\text{Mn}_y\text{Fe}_{1-y}\text{PO}_4$ and $\text{Li}_x\text{Mn}_y\text{Fe}_z\text{Al}_{1-(y+z)}\text{PO}_4$, where $0 < x \leq 2$, $0.5 < y < 0.95$, and $0.5 < y+z < 1$ and an electrification agent in an amount of 0.5 to 20 parts by weight to 100 parts by weight of the lithium transition metal phosphate material, wherein a portion of the lithium transition metal phosphate has a grain size not larger than $10\text{ }\mu\text{m}$ and a Bulnauer Emmet Taylor specific surface area of not less than $0.5\text{ m}^2/\text{g}$. The prior art does not teach a lithium transition metal phosphate cathode material, as claimed, with a grain size not larger than $10\text{ }\mu\text{m}$ and a Bulnauer Emmet Taylor specific surface area of not less than $0.5\text{ m}^2/\text{g}$, combined with an

Art Unit: 1745

electrification agent in an amount of 0.5 to 20 parts by weight to 100 parts by weight of the lithium transition metal phosphate material.

With regard to claims 3 and 7, the instant claims are to a non-aqueous cell and a positive electrode active material for lithium secondary batteries comprising lithium transition metal phosphate structures such as $\text{Li}_x\text{Mn}_y\text{Fe}_z\text{A}_{1-(y+z)}\text{PO}_4$, where A is selected from Ti or Ag. A portion of the material has a grain size not larger than $10\text{ }\mu\text{m}$ and has a BET surface area of not less than $0.5\text{ m}^2/\text{g}$. The prior art does not teach a positive electrode active material comprising $\text{Li}_x\text{Mn}_y\text{Fe}_z\text{A}_{1-(y+z)}\text{PO}_4$, where A is selected from Ti or Ag with a portion of the material has a grain size not larger than $10\text{ }\mu\text{m}$ and has a BET surface area of not less than $0.5\text{ m}^2/\text{g}$.

The most pertinent prior art includes Goodenough et al. (US 5,910,382), which teaches a cathode material for lithium secondary batteries comprising LiMPO_4 , where M is Mn, Fe, Co, Ti, and Ni. Examples of mixed metal structures include $\text{LiMn}_x\text{Fe}_{1-x}\text{PO}_4$, and $\text{LiTi}_x\text{Fe}_{1-x}\text{PO}_4$ wherein X is between 0 and 1 (see col. 2 and claims 1-9.) The reference does not teach a lithium transition metal phosphate having a grain size not larger than $10\text{ }\mu\text{m}$ and a Bulnauer Emmet Taylor specific surface area of not less than $0.5\text{ m}^2/\text{g}$ or an electrification agent in an amount of 0.5 to 20 parts by weight to 100 parts by weight of the lithium transition metal phosphate material. In addition, Iwata et al. (US 5,807,646) teaches a lithium manganese oxide cathode material with a grain size not large than $10\text{ }\mu\text{m}$ and a surface area of not less than $0.5\text{ m}^2/\text{g}$ (see the claims.) The material is used as a cathode in a lithium secondary battery with a conductive material added in a ratio of about 50% of the active material. The reference does not teach a lithium transition metal phosphate having a grain size not larger than $10\text{ }\mu\text{m}$ and a Bulnauer Emmet Taylor specific surface area of not less than $0.5\text{ m}^2/\text{g}$ or an electrification agent in an

Art Unit: 1745

amount of 0.5 to 20 parts by weight to 100 parts by weight of the lithium transition metal phosphate material.

As the prior art does not teach a lithium transition metal phosphate cathode material, as claimed, with a grain size not large than 10 μm , a Bulnauer Emmet Taylor specific surface area of not less than 0.5 m^2/g combined with an electrification agent in an amount of 0.5 to 20 parts by weight to 100 parts by weight of the lithium transition metal phosphate material, the claims are allowed.

Further, the prior art does not teach a positive electrode active material comprising $\text{Li}_x\text{Mn}_y\text{Fe}_z\text{A}_{1-(y+z)}\text{PO}_4$, where $0 < x \leq 2$, $0.5 < y, 0.95$, $0.5 < y+z < 1$ and where A is selected from Ti or Ag with a portion of the material has a grain size not larger than 10 μm and has a BET surface area of not less than 0.5 m^2/g and, therefore, the claims are allowed

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Examiner Correspondence

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1193. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Ruthkosky whose telephone number is 703-305-0587. The examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-6:00.) If attempts to reach

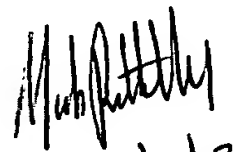
Art Unit: 1745

the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at 703-308-2383. The fax number is 703-872-9306.

Mark Ruthkosky

Primary Patent Examiner

Art Unit 1745



12/15/03